

CLAIMS

1. (Currently Amended) A hydrogen gas generating system, comprising:
a membrane electrode assembly including an anode, a cathode and an ionically conductive membrane there between;
electrical connections for applying electrical power from a source of electrical power to said cathode and anode; and
a non-circulating ~~fuel transport system~~ layer for transferring a water/fuel mixture by capillary action through a first portion of the layer from a source of the water/fuel mixture to said anode to generate hydrogen gas and through a second portion of the layer from the first portion to a vent to transport gases released by consumption of the water/fuel mixture away from the anode, the second portion of the layer acting as a barrier to the transport of the water/fuel mixture to the vent.
2. (Currently Amended) The invention of claim 1, wherein said non-circulating ~~fuel transport system~~ layer further comprises:
a the first portion is in contact with the water/fuel mixture for transporting the water/fuel mixture to the anode and a the second portion is in contact with said first portion for collecting gases therefrom.
3. (Currently Amended) The invention of claim 2, wherein areas of said first and second portions are interspersed along the contact between the first and second portions.
4. (Currently Amended) The invention of claim 2, wherein said areas of said first and second portions are interlaced.
5. (Currently Amended) The inventions of claims 2 or 3, wherein
said first portion is hydrophilic; and
said second portion is hydrophobic,
whereby the second portion acts as the barrier to the transport of the water/fuel mixture to the vent for the released gases.

6. (Currently Amended) The inventions of claims 2 or 3, wherein
said first portion has higher capillary forces than said second portion,
whereby the second portion acts as the barrier to the transport of the water/fuel mixture to the vent
for the released gases.

7. (Currently Amended) The inventions of claims 2 or 3, wherein
said first portion has a smaller effective pore size than said second portion,
whereby the second portion acts as the barrier to the transport of the water/fuel mixture to the vent
for the released gases.

8. (Currently Amended) The invention of claims 2 or 3 wherein the non-circulating fuel
transport system layer further comprises:
a replaceable fuel/water canister; and
a compartment receiving the released cases for pressurizing the replaceable water/fuel
mixture.

9-14. (Canceled)

15. (Currently Amended) The invention of claim-~~12~~-1 wherein generated hydrogen gas is
provided to a source of electrical power connected to a load in addition to said membrane electrode
assembly, said invention further comprising:

a forward regulator for varying the amount of hydrogen gas provided by the membrane
electrode assembly to the source of electrical power to enhance load following characteristics of the
source for changes in the amount of electrical power required by the load.

16. (Canceled)

17. (Original) The invention of claim 15, wherein said forward regulator opens to provide additional hydrogen gas to the source of electrical power when the operating efficiency of the source is reduced.
18. (Canceled)
19. (Previously Presented) The invention of claim 15, further comprising:
electrical connections for applying electrical power, produced by the load during regeneration, to said membrane electrode assembly while closing said forward regulator to store excess hydrogen produced by said membrane electrode assembly in said hydrogen storage tank.
20. (Original) The invention of claim 15, further comprising:
a backpressure regulator between said membrane electrode assembly and said hydrogen storage tank;
a vent regulator for controlling the pressure of gases being vented by said anode; and
a connection for referencing the pressure of said backpressure regulator to said vent regulator to maintain the pressure at said cathode above the pressure at said anode.
21. (Currently Amended) The invention of claim[[s]] 1 ~~or 12~~ further comprising:
a cooling system within said membrane electrode assembly for recovering liquid from gases produced by said membrane electrode assembly.
22. (Original) The invention of claim 21, wherein the cooling system further comprises:
at least one cooling port positioned adjacent an upper end of said membrane electrode assembly to condense gaseous water fuel mixture in the gases produced thereby.
23. (Original) The invention of claim 21, wherein gaseous water/fuel mixture condensed adjacent said cathode is returned to said cathode.
24. (Original) The invention of claim 21, further comprising:

a hydrophilic transport mechanism for returning the condensed water/fuel mixture to said cathode.

25. (Original) The invention of claim 22, wherein gaseous water/fuel mixture condensed adjacent said anode is returned to said anode.

26. (Original) The invention of claim 25, wherein gaseous water/fuel mixture condensed adjacent said anode is returned to said anode by said water/fuel transport system.

27. (Original) The invention of claim 26, wherein said membrane electrode assembly and water/fuel transport system forming a first cell, the invention further comprising:
one or more additional cells positioned adjacent said first cell to form a stack;
current collectors positioned between each cell and at the beginning and end of the stack; and
additional cooling ports positioned in an upper end of one or more of said current collectors.

28-38. (Canceled).

39. (New) A self contained hydrogen gas generating cylinder, comprising:

- a) a cylindrically shaped membrane electrode assembly including
 - a transport layer,
 - an anode layer,
 - a conductive membrane layer, and
 - a cathode layer formed in a spiral coil,

the transport layer wicking a water/fuel mixture from a first end of the assembly along a first path to the anode layer and transporting released gases along a second path in series with the first path from the anode layer to a second end of the assembly;

- b) a central core within the spiral coil, the central core having a passageway there through, the central core being substantially longer than the cylindrically shaped membrane electrode assembly; and

c) a cylindrical container housing said cylindrically shaped membrane electrode assembly and central core, the housing including

a water/fuel compartment adjacent the first end of the electrode assembly in liquid communication with the transport layer,

a released gases compartment adjacent the second end of the electrode assembly in gaseous communication with the transport layer for collecting gases released from the anode layer,

a hydrogen storage compartment adjacent the second end of the electrode assembly in gaseous communication with the cathode layer for collecting hydrogen gas released therefrom,

a first end cap electrode having an output passageway there through for release of hydrogen gas from the hydrogen storage compartment, and

a second end cap electrode having a vent aperture there through in communication with the central core passageway for venting the released gases.

40. (New) The self contained hydrogen gas generating cylinder of claim 39 further comprising:
a valving system for selectively releasing hydrogen gas from the hydrogen storage compartment through the output passageway in the first end cap electrode and for selectively releasing released gases from the released gases compartment through the vent aperture in the second end cap electrode.

41. (New) The self contained hydrogen gas generating cylinder of claim 40 further comprising:
a fuel diaphragm in gaseous communication with the released gases compartment for pressurizing the water/fuel compartment.

42. (New) The self contained hydrogen gas generating cylinder of claim 40 further comprising:
an output diaphragm between the hydrogen storage compartment and the released gases compartment for pressurizing the hydrogen storage compartment.